AMENDMENTS TO THE CLAIMS

Following is a listing of all claims in the present application, which listing supersedes all previously presented claims:

Listing of Claims:

1. (Currently Amended) A method for manufacturing a magnetic field detecting element ~~consisting of~~ having a soft magnetic core formed on a semiconductor substrate[[; a]], first and [[a]] second coils arranged on [[an]] upper and [[a]] lower [[parts]] surfaces of the soft magnetic core, respectively, the first and second coils each having a plurality of coil lines, ~~respectively,~~ the method comprising ~~the steps of~~:

forming a seed film [[of]] to a predetermined thickness on the semiconductor substrate;

removing a portion of the seed film using a predetermined pattern so that [[a]] each of the plurality of [[the]] coil lines constituting the first coil that ~~would be~~ is subsequently formed on a remaining portion of the seed film ~~may be partitioned each other~~ is separated from the others;

forming a first plating mold having a plurality of grooves ~~that corresponds~~ corresponding to the predetermined pattern, on an upper [[part]] portion of the seed film;

forming [[a]] the plurality of [[the]] coil lines constituting the first coil by filling ~~up metal in~~ the ~~groove~~ plurality of grooves of the first plating mold with metal;

forming [[a]] the soft magnetic core and the second coil on an upper [[part]] portion of the semiconductor substrate and on the remaining portion of the seed film where the first coil is formed; and

cutting off [[four]] edges of the semiconductor substrate so that [[a]] each of the plurality of [[the]] coil lines ~~partitioned~~ separated by the predetermined pattern ~~may be~~ are insulated from each other.

2. (Currently Amended) The method ~~according to~~ as claimed in claim 1, wherein ~~the step of~~ removing the portion of the seed film further comprises: ~~the steps of: spreading~~ forming a photoresist layer on an upper surface of the seed film; ~~forming a predetermined pattern that would be removed, by~~ exposing and developing the photoresist to form the predetermined pattern; and etching the seed film according to the predetermined pattern.

3. (Currently Amended) The method ~~according to~~ as claimed in claim 1, wherein ~~metal is filled up in the groove~~ filling the plurality of grooves of the first plating mold ~~by means of an~~ with metal comprises electric plating.

4. (Currently Amended) The method ~~according to~~ as claimed in claim 1, wherein ~~the step of~~ forming the soft magnetic core further comprises ~~the steps of~~:

~~performing planarization of~~ planarizing an upper surface of the semiconductor substrate on which the first coil is formed;

spreading an insulating film on [[an]] the planarized upper surface of the semiconductor substrate ~~for which planarization has been performed~~;

spreading a soft magnetic material film on an upper [[part]] surface of the insulating film;

forming a ~~pattern of the soft magnetic core through exposing and developing processes after spreading a~~ photoresist layer on the soft magnetic material film and exposing and developing the photoresist layer to form a pattern of the soft magnetic core; and

etching the soft magnetic material film according to the pattern.

5. (Currently Amended) The method ~~according to~~ as claimed in claim 1, wherein ~~the step of~~ forming the soft magnetic core ~~further~~ comprises ~~the steps of~~:

removing the first plating mold;

~~spreading~~ forming an insulating film [[at]] to a height ~~higher~~ greater than a height of the first coil[[,]] on an upper [[part]] surface of the semiconductor substrate from which the first plating mold has been removed;

spreading a soft magnetic material film on an upper [[part]] surface of the insulating film;

forming ~~a soft magnetic core pattern through exposing and developing processes after spreading~~ a photoresist layer on the soft magnetic material film and exposing and developing the photoresist layer to form a pattern of the soft magnetic core; and

etching the soft magnetic material film according to the pattern.

6. (Currently Amended) A method for manufacturing a magnetic field detecting element ~~consisting of~~ having a soft magnetic core formed on a semiconductor substrate,~~; and a~~ first and [[a]] second coils respectively arranged on [[an]] upper and [[a]] lower [[parts]] surfaces of the soft magnetic core, [[and]] the first and second coils each having a plurality of coil lines, ~~respectively,~~ the method comprising ~~the steps of~~:

forming a first seed film [[of]] to a predetermined thickness on the semiconductor substrate;

removing a portion of the first seed film using a predetermined first pattern so that [[a]] each of the plurality of coil lines constituting the first coil ~~that would~~ to be subsequently formed on the first seed film ~~may be partitioned each other~~ is separated from the others;

forming a first plating mold having a plurality of grooves that corresponds to the predetermined first pattern, on an upper [[part]] portion of the first seed film;

forming [[a]] the plurality of coil lines constituting the first coil by filling ~~up metal in the groove~~ the plurality of grooves of the first plating mold with metal;

forming [[a]] the soft magnetic core on the semiconductor substrate where the first coil is formed;

forming a second insulating film on the semiconductor substrate where the soft magnetic core is formed;

forming a second seed film on an upper surface of the second insulating film;

removing the second seed film using a predetermined second pattern so that a plurality of coil lines constituting the second coil ~~that would~~ to be subsequently formed on the second seed film ~~may be partitioned~~ are separated from each other;

forming a second plating mold having a plurality of grooves ~~that corresponds~~ corresponding to the second pattern, on an upper [[part]] portion of the second seed film;

forming a plurality of coil lines constituting the second coil by filling ~~up metal in~~ the plurality of grooves ~~groove~~ of the second plating mold with metal; and

cutting off edges on [[four]] sides of the semiconductor substrate so that [[a]] each of the plurality of [[the]] coil lines constituting the first and the second coils ~~partitioned~~ separated by the first and the second patterns ~~may be~~ are insulated from each other.

7. (Currently Amended) The method ~~according to~~ as claimed in claim 6, wherein ~~metal is filled up in~~ filling the plurality of grooves of the first and the second plating molds with metal comprises ~~by means of an~~ electric plating.

8. (Currently Amended) The method ~~according to~~ as claimed in claim 6, wherein ~~the step of~~ forming the soft magnetic core further comprises ~~the steps of~~:

~~performing planarization of~~ planarizing an upper surface of the semiconductor substrate on which the first coil is formed;

spreading a first insulating film on [[an]] the planarized upper surface of the semiconductor substrate ~~for which planarization has been performed~~;

spreading a soft magnetic material film on an upper [[part]] portion of the first insulating film;

forming a ~~soft magnetic core pattern through exposing and developing processes after spreading a~~ photoresist layer on the soft magnetic material film and exposing and developing the photoresist layer to form a pattern of the soft magnetic core; and

etching the soft magnetic material film according to the pattern.

9. (Currently Amended) A method for manufacturing a magnetic field detecting element, ~~including the steps of:~~ comprising:

forming a well to a predetermined depth in a semiconductor substrate;

forming a first coil on ~~an upper part of a~~ the semiconductor substrate, the first coil being arranged within the well below an upper surface of the semiconductor substrate;

~~after~~ forming a first insulating film on an upper portion of the first coil and forming a soft magnetic core on an upper [[part]] portion of the first ~~coil with an~~ insulating film ~~intervened~~[[,]];

forming a second insulating film on an upper portion of the soft magnetic core; and

forming a second coil on an upper [[part]] portion of the ~~soft magnetic core with another~~ second insulating film ~~intervened, the method comprising the step of:~~

~~after forming a well of a predetermined dept on the semiconductor substrate, arranging the first coil in an inside of the well lest the first coil should be projected to a surface of the semiconductor substrate~~.

10. (Currently Amended) A method for manufacturing a magnetic field detecting element, comprising ~~the steps of~~:

preparing a semiconductor substrate;

forming a well [[of]] to a predetermined ~~dept on~~ depth in the semiconductor substrate;

forming a first coil consisting of a plurality of coil lines ~~in an inside of~~ within the well of the semiconductor substrate;

forming a first insulating film on an upper [[part]] portion of the semiconductor substrate including the well;

forming a soft magnetic core on an upper [[part]] portion of the first insulating film;

forming a second insulating film on an upper [[part]] portion of the first insulating film including the soft magnetic core; and

forming a second coil ~~that corresponds~~ corresponding to the first coil, on an upper [[part]] portion of the second insulating film.

11. (Currently Amended) The method ~~according to~~ as claimed in claim 10, wherein forming the well comprises etching inner sidewalls of the well to be ~~is formed in such a way that the well has an inclined sidewall that is~~ gradually inclined ~~in its inside~~ from [[its]] an upper [[part]] portion of the well to [[its]] a bottom ~~by the etching process~~ of the well.

12. (Currently Amended) The method ~~according to~~ as claimed in claim 10, wherein ~~the step of~~ forming the first coil further comprises ~~the steps of~~:

forming a first seed film on a surface of the well;

forming a first plating mold having a plurality of grooves on the first seed film;

forming a plurality of coil lines constituting the first coil by filling the plurality of grooves ~~up metal in each groove~~ of the first plating mold with metal; and

removing the first plating mold and the first seed film under the first plating mold.

13. (Currently Amended) The method ~~according to~~ as claimed in claim 12, wherein filling the plurality of grooves ~~metal is filled up in each groove~~ of the first plating mold with metal ~~by means of an~~ comprises electric plating.

14. (Currently Amended) The method ~~according to~~ as claimed in claim 10, wherein ~~the step of~~ forming the second coil further comprises ~~the steps of~~:

forming a via hole by etching the first and [[the]] second insulating films on both sides of the soft magnetic core;

forming a second seed film on an upper surface of the second insulating film [[on]] in which the via hole is formed;

forming a second plating mold having a plurality of grooves[[,]] on the second seed film;

forming a plurality of coil lines constituting a second coil by filling the plurality of grooves ~~up metal in each groove~~ of the second plating mold[[,]] with metal and connecting the first coil with the second coil through the via hole; and

removing the second plating mold and the second seed film under the second plating mold.

15. (Currently Amended) The method ~~according to~~ as claimed in claim 14, wherein filling the plurality of grooves ~~metal is filled up in each groove~~ of the second plating mold with metal ~~by means of an~~ comprises electric plating.

16. (Currently Amended) The method ~~according to~~ as claimed in claim 10, further comprising ~~the step of~~ forming a protection film on the semiconductor substrate ~~for protecting structures~~ including the second coil to protect a structure formed thereon.

17. (Currently Amended) A magnetic field detecting element, comprising:

a semiconductor substrate;

a soft magnetic core formed on an upper [[part]] portion of the semiconductor substrate;

an insulating film positioned on an upper and a lower [[parts]] portions of the soft magnetic core; and

[[a]] first and [[a]] second coils, each including a plurality of coil lines, formed ~~in such a way that those coils~~ to enclose the soft magnetic core with the ~~soft magnetic core and the~~ insulating film ~~intervened, and having a plurality of coil lines, respectively~~ intervening therebetween,

wherein a well of a predetermined [[dept]] depth is formed [[on]] in the semiconductor substrate and the plurality of coil lines constituting the first coil are arranged ~~in an inside of~~ within the well.

18. (Currently Amended) The element ~~according to~~ as claimed in claim 17, wherein a height of the coil lines and a [[dept]] depth of the well are the same.

19. (Currently Amended) The element ~~according to~~ as claimed in claim 17, wherein the first coil is positioned at a lower [[part]] portion of the soft magnetic core and the second coil is positioned at an upper [[part]] portion of the soft magnetic core, and the plurality of coil lines of the first and [[the]] second coils are connected by ~~means of~~ a third coil ~~filled in the~~ filling a via hole formed ~~by passing~~ through the insulating film on both sides of the soft magnetic core.

20. (Currently Amended) The element ~~according to~~ as claimed in claim 17, wherein inner sidewalls of the well ~~has an inclined sidewall that is~~ are gradually inclined ~~in its inside~~ from [[its]] an upper [[part]] portion of the well to [[its]] a bottom of the well.